AMENDMENTS

IN THE SPECIFICATION

Please amend the Specification by substituting paragraphs as indicated below. Please note that the attached Exhibit A provides an edited version of the changes to the Specification, and highlights all such amendments.

Please substitute the paragraph on page 2, lines 1-14, containing the text:

-- BACKGROUND OF THE INVENTION

Various deposition technologies exist for plating and coating materials. These various technologies include, for example, vacuum deposition or physical vapor deposition ("PVD"), chemical vapor deposition ("CVD"), sputtering, and ion plating. All of these deposition technologies suffer from disadvantages such as poor deposition layer adhesion, high cost, generation of environmentally wasteful products that are expensive and cumbersome to dispose, damage to the substrate, elevated substrate temperatures, nonuniform deposition layers, inefficient use of expensive depositants, and inconsistent application of deposition layers are among some of the disadvantages suffered by one or more of the prior deposition technologies. --

and insert in its place the following pargraph:

-- BACKGROUND OF THE INVENTION

Various deposition technologies exist for plating and coating materials. These various technologies include, for example, vacuum deposition or physical vapor deposition ("PVD"), chemical vapor deposition ("CVD"), sputtering, and ion plating. These deposition technologies suffer from various disadvantages. These disadvantages may include, for example, poor deposition layer adhesion, high cost, generation of environmentally wasteful products that are expensive and cumbersome to dispose, damage to the substrate, elevated substrate temperatures, nonuniform deposition layers, inefficient use of expensive depositants, and inconsistent application of deposition layers. --

C1

Please substitute the paragraph on lines 31-32 of page 3 thru lines 1-16 of page 4, containing the text:

-- According to another aspect of the present invention, an system for plasma plating is provided that generates a deposition layer on a substrate. The system for plasma plating includes a vacuum chamber at a pressure that extends from 0.1 milliTorr to 4 milliTorr, a filament with an associated depositant located on or in the filament, a platform positioned within the vacuum chamber, a substrate positioned at

or on the platform, a dc power supply generating a dc signal at a voltage in a range that extends from 1 volt to 5000 volts, a radio frequency transmitter generating a radio frequency signal at a power level defined by a range that extends from 1 watt to 50 watts, an electrically conductive path that electrically couples the dc signal and the radio frequency signal to the substrate, and a filament power control electrically coupled to the filament and generating a current through the filament at an amplitude to generate heat in the filament to melt the depositant. --

and insert in its place the following pargraph:

C2

-- According to another aspect of the present invention, a system for plasma plating is provided that generates a deposition layer on a substrate. The system for plasma plating includes a vacuum chamber at a pressure that extends from 0.1 milliTorr to 4 milliTorr, a filament with an associated depositant located on or in the filament, a platform positioned within the vacuum chamber, a substrate positioned at or on the platform, a dc power supply generating a dc signal at a voltage in a range that extends from 1 volt to 5000 volts, a radio frequency transmitter generating a radio frequency signal at a power level defined by a range that extends from 1 watt to 50

watts, an electrically conductive path that electrically couples the dc signal and the radio frequency signal to the substrate, and a filament power control electrically coupled to the filament and generating a current through the filament at an amplitude to generate heat in the filament to melt the depositant. --

C2 concl'd

Please substitute the paragraph on page 4, lines 27-33, containing the text:

-- Another technical advantage of the present invention includes the capability to efficiently use depositants to minimize the consumption of depositants, which often are expensive precious metals such as gold and even platinum. These efficiencies are achieve through the proper placement of filaments and the use of proper operational parameters. This significantly reduces overall costs. --

and insert in its place the following pargraph:

C3

-- Another technical advantage of the present invention includes the capability to efficiently use depositants to minimize the consumption of depositants, which often are expensive precious metals such as gold and even platinum. These efficiencies

C3 concl'd

are achieved through the proper placement of filaments and the use of proper operational parameters. This significantly reduces overall costs. --

Please substitute the paragraph on page 5, lines 25-31, containing the text:

-- Still yet another technical advantage includes the capability plate a substrate with a deposition layer with a thickness that is small enough so as not to change the functional shape of the substrate, such as a bolt, a nut, a fastner, and other components with strict tolerances. The present invention will also work in the presence of an oxidation layer. --

and insert in its place the following pargraph:

C4

-- Still yet another technical advantage includes the capability to plate a substrate with a deposition layer with a thickness that is small enough so as not to change the functional shape of the substrate, such as a bolt, a nut, a fastener, and other components with strict tolerances. The present invention will also work in the presence of an oxidation layer. --

Please substitute the paragraph on page 8, lines 10-26, containing the text:

> -- **FIGURE 1** is a schematic diagram that illustrates a system 10 for plasma plating that can be used to plate any of a variety of materials, according to an embodiment of the present invention. The system 10 includes various equipment used to support the plasma plating of a substrate 12 within a vacuum chamber 14. Once appropriate operating parameters and conditions are achieved, a depositant provided in a filament 16 and a filament 18 may be evaporated or vaporized to form a plasma. The plasma will contain, generally, positively charged ions from the depositant and will be attracted to the substrate 12 where they will form a deposition layer. The plasma may be thought of as a cloud of ions that surround or are located near the substrate 12. The plasma will generally develop a dark region, near the closest surface of the substrate 12 from the filament 12 and the filament 18, that provides acceleration of the positive ions into the substrate 12. --

and insert in its place the following paragraph:

C5

> -- **FIGURE 1** is a schematic diagram that illustrates a system 10 for plasma plating that can be used to plate any of a variety of materials, according to an

embodiment of the present invention. The system 10 includes various equipment used to support the plasma plating of a substrate 12 within a vacuum chamber 14. Once appropriate operating parameters and conditions are achieved, a depositant provided in a filament 16 and a filament 18 may be evaporated or vaporized to form a plasma. The plasma will contain, generally, positively charged ions from the depositant and will be attracted to the substrate 12 where they will form a deposition layer. The plasma may be thought of as a cloud of ions that surround or are located near the substrate 12. The plasma will generally develop a dark region, near the closest surface of the substrate 12 from the filament 16 and the filament 18, that provides acceleration of the positive ions to the substrate 12. --

C5 concl'd

Please substitute the paragraph on lines 27-32 of page 8, thru lines 1-7, containing the text:

-- The filament 12 and the filament 14 reside within the vacuum chamber 14 along with a platform 20, which supports the substrate 12. A drive assembly 22 is shown coupled between a drive motor 24 and a main shaft of the platform 20 within the vacuum chamber 14. In the embodiment shown in FIGURE 1, the platform 20 is provided as a turntable that rotates within the

vacuum chamber 14. The drive assembly 22 mechanically links the rotational motion of the drive motor 24 with the main shaft of the platform 20 to impart rotation to the platform 20. The rotation of the main shaft of the platform 20 is enhanced through various support bearings such as a base plate bearing 28 and a platform bearing 30. --

and insert in its place the following paragraph:

-- The filament 16 and the filament 18 reside within the vacuum chamber 14 along with a platform 20, which supports the substrate 12. A drive assembly 22 is shown coupled between a drive motor 24 and a main shaft of the platform 20 within the vacuum chamber 14. In the embodiment shown in FIGURE 1, the platform 20 is provided as a turntable that rotates within the vacuum chamber 14. The drive assembly 22 mechanically links the rotational motion of the drive motor 24 with the main shaft of the platform 20 to impart rotation to the platform 20. The rotation of the main shaft of the platform 20 is enhanced through various support bearings such as a base plate bearing 28 and a platform bearing 30. --

C2

Please substitute the paragraph on page 10, lines 11-29 containing the text:

-- The filament power control module 34 provides an electric current to the filament 16 and the filament 18. In one embodiment, the filament power control module 34 can provide current to the filament 16 for a particular duration, and then provide current to the filament 18 during a second duration. Depending upon how the filaments are configured, the filament power control module 34 may provide current to both the filament 16 and the filament 18 at the same time or during separate intervals. This flexibility allows more than one particular depositant material to be plasma plated onto the substrate 12 at different times. The filament power control module 34 preferably provides alternating current to the filaments, but may provide a current using any known method of generating current. In a preferred embodiment, the filament power control module 34 provides current at an amplitude or magnitude that is sufficient to generate enough heat in the filament 16 to evaporate or vaporize the depositant. --

and insert in its place the following paragraph:

C7

-- The filament power control module 34 provides an electric current to the filament 16 and the filament 18. In one embodiment, the filament power control module 34 can provide current to the filament 16 for a

particular duration, and then provide current to the filament 18 during a second duration. Depending upon how the filaments are configured, the filament power control module 34 may provide current to both the filament 16 and the filament 18 at the same time or during separate intervals. This flexibility allows more than one particular depositant material to be plasma plated onto the substrate 12 at different times. The filament power control module 34 preferably provides alternating current to the filaments, but may provide a current using any known method of generating current. In a preferred embodiment, the filament power control module 34 provides current at an amplitude or magnitude that is sufficient to generate enough heat in the filament 16 to evaporate or vaporize the depositant provided therein. --

C7 concl'd

Please substitute the paragraph on page 13, lines 4-19 containing the text:

-- The remaining equipment and components of the system 10 of FIGURE 1 are used to create, maintain, and control the desired vacuum condition within the vacuum chamber 14. This is achieved through the use of a vacuum system. The vacuum system includes a roughing pump 46 and a roughing valve 48 that is used

to initially pull down the pressure in the vacuum chamber 14. The vacuum system also includes a foreline pump 40, a foreline valve 44, a diffusion pump 42, and a main valve 50. The foreline valve 44 is opened so that the foreline pump 40 can began to function. After the diffusion pump 42 is warmed or heated to an appropriate level, the main valve 50 is opened, after the roughing pump 40 has been shut in by closing the roughing valve 44. This allows the diffusion pump 42 to further reduce the pressure in the vacuum chamber 14 below a desired level. --

and insert in its place the following paragraph:

C8

-- The remaining equipment and components of the system 10 of FIGURE 1 are used to create, maintain, and control the desired vacuum condition within the vacuum chamber 14. This is achieved through the use of a vacuum system. The vacuum system includes a roughing pump 46 and a roughing valve 48 that is used to initially pull down the pressure in the vacuum chamber 14. The vacuum system also includes a foreline pump 40, a foreline valve 44, a diffusion pump 42, and a main valve 50. The foreline valve 44 is opened so that the foreline pump 40 can began to function. After the diffusion pump 42 is warmed or heated to an appropriate level, the main valve 50 is opened, after the roughing pump 46 has been shut in by

C8
cncl'd

closing the roughing valve 48. This allows the diffusion pump 42 to further reduce the pressure in the vacuum chamber 14 below a desired level. --

Please substitute the paragraph on lines 30-33 of page 14, thru lines 1-16 of page 15 containing the text:

-- As described above, the vacuum system includes the roughing pump 46 and the diffusion pump 42, which is used with the foreline pump 40. The roughing pump 46 couples to the vacuum chamber 14 through the roughing valve 48. When the roughing valve 48 is open, the roughing pump 46 may be used to initially reduce the pressure within the vacuum chamber 14. Once a desired lower pressure is achieved within the vacuum chamber 14, the roughing valve 48 is closed. The roughing pump 46 couples to the vacuum chamber 14 through a hole or opening through the base plate 32. The roughing pump 46 will preferably be provided as a mechanical pump. In a preferred embodiment of the vacuum system of the system 10 as shown in FIGURE 1. The vacuum system in this embodiment includes a foreline pump coupled to a diffusion pump 42 through a foreline valve 44. The foreline pump 40 may be implemented as a mechanical pump that is used in combination with the diffusion pump 42 to reduce the pressure within the vacuum chamber 14 to a level even

lower than that which was produced through the use of the roughing pump 46. --

and insert in its place the following paragraph:

C9

-- As described above, the vacuum system includes the roughing pump 46 and the diffusion pump 42, which is used with the foreline pump 40. The roughing pump 46 couples to the vacuum chamber 14 through the roughing valve 48. When the roughing valve 48 is open, the roughing pump 46 may be used to initially reduce the pressure within the vacuum chamber 14. Once a desired lower pressure is achieved within the vacuum chamber 14, the roughing valve 48 is closed. The roughing pump 46 couples to the vacuum chamber 14 through a hole or opening through the base plate 32. The roughing pump 46 will preferably be provided as a mechanical pump. In a preferred embodiment of the vacuum system of the system 10 as shown in FIGURE 1, the vacuum system in this embodiment also includes a foreline pump 40 coupled to a diffusion pump 42 through a foreline valve 44. The foreline pump 40 may be implemented as a mechanical pump that is used in combination with the diffusion pump 42 to reduce the pressure within the vacuum chamber 14 to a level even lower than that which was produced through the use of the roughing pump 46. --

Please substitute the paragraph on lines 17-33 of page 15, thru lines 1-10 of page 16 containing the text:

-- After the roughing pump has reduced the pressure within the vacuum chamber 14, the diffusion pump 42, which uses heaters and may require the use of cooling water or some other substance to cool the diffusion pump 42, couples with the vacuum chamber 14 through a main valve 50 and through various holes or openings through the base plate 32 as indicated in FIGURE 1 by the dashed lines above the main valve 50 and below the platform 20. Once the diffusion pump 42 has been heated up and made ready for operation, the main valve 50 may be opened so that the pressure within the vacuum chamber 14 may be further reduced through the action of the diffusion pump 42 in combination with the foreline pump 44. For example, the pressure within the vacuum chamber 14 may be brought below 4 milliTorr. During a backsputtering process, the pressure in the vacuum chamber 14 may be dropped to a level at or below 100 milliTorr on down to 20 milliTorr. Preferably, the pressure within the vacuum chamber 14 during a backsputtering process will be at a level at or below 50 milliTorr on down to 30 milliTorr. During normal operation of the system 10 during a plasma plating process, the pressure within the vacuum chamber 14 may be reduced by the vacuum

system to a level at or below 4 milliTorr on down to a value of 0.1 milliTorr. Preferably, the vacuum system will be used during a plasma plating process to reduce the pressure within the vacuum chamber 14 to a level at or below 1.5 milliTorr on down to 0.5 milliTorr.--

and insert in its place the following paragraph:

C10

-- After the roughing pump 46 has reduced the pressure within the vacuum chamber 14, the diffusion pump 42, which uses heaters and may require the use of cooling water or some other substance to cool the diffusion pump 42, couples with the vacuum chamber 14 through a main valve 50 and through various holes or openings through the base plate 32 as indicated in FIGURE 1 by the dashed lines above the main valve 50 and below the platform 20. Once the diffusion pump 42 has been heated up and made ready for operation, the main valve 50 may be opened so that the pressure within the vacuum chamber 14 may be further reduced through the action of the diffusion pump 42 in combination with the foreline pump 44. For example, the pressure within the vacuum chamber 14 may be brought below 4 milliTorr. During a backsputtering process, the pressure in the vacuum chamber 14 may be dropped to a level at or below 100 milliTorr on down to 20 milliTorr. Preferably, the pressure within the

vacuum chamber 14 during a backsputtering process will be at a level at or below 50 milliTorr on down to 30 milliTorr. During normal operation of the system 10 during a plasma plating process, the pressure within the vacuum chamber 14 may be reduced by the vacuum system to a level at or below 4 milliTorr on down to a value of 0.1 milliTorr. Preferably, the vacuum system will be used during a plasma plating process to reduce the pressure within the vacuum chamber 14 to a level at or below 1.5 milliTorr on down to 0.5 milliTorr.--

C10 concl'd

Please substitute the paragraph on lines 26-32 of page 18, thru lines 1-15 of page 19 containing the text:

-- **FIGURE 3** is a side view that illustrates the formation and dispersion of a plasma around a filament 100 to plasma plate a substrate 12 according to an embodiment of the present invention. The filament 100 is implemented as a wire basket, such as tungsten wire basket, and is shown with a depositant 102 located, and mechanically supported, within the filament 100. As the filament power control module 34 provides sufficient current to the filament 100, the depositant 102 melts or vaporizes and a plasma 104 is formed. Of course, all of the operating parameters of the present

invention must be present in order to achieve the plasma state so that plasma plating may takes place.--

and insert in its place the following paragraph:

-- **FIGURE 3** is a side view that illustrates the formation and dispersion of a plasma around a filament 100 to plasma plate a substrate 12 according to an embodiment of the present invention. The filament 100 is implemented as a wire basket, such as tungsten wire basket, and is shown with a depositant 102 located within, and mechanically supported by the filament 100. As the filament power control module 34 provides sufficient current to the filament 100, the depositant 102 melts or vaporizes and a plasma 104 is formed. Of course, all of the operating parameters of the present invention must be present in order to achieve the plasma state so that plasma plating may take place.--

C 11